

# **Difficult Run and Accotink Creek Bacteria and Benthic TMDLs Development**

**Public Meeting**

**August 14, 2007**



THE Louis Berger Group, INC.

## Objective:

- To present and review the steps and the data used in the development of bacteria and benthic TMDLs for listed segments in the Difficult Run and Accotink Creek Watersheds.

# Bacteria TMDL: Difficult Run

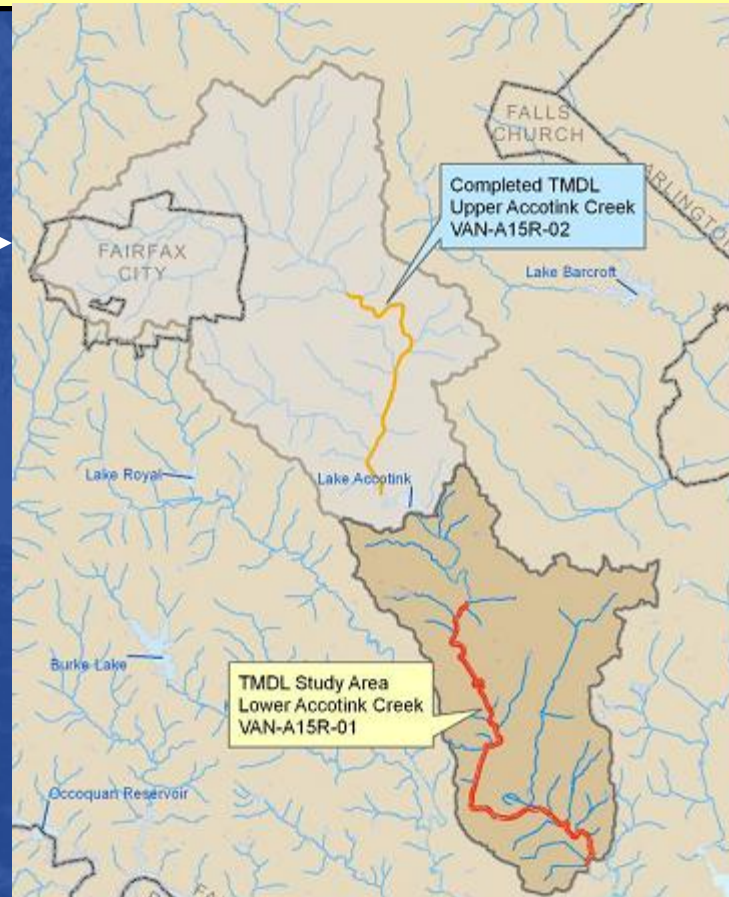


TMDL ID	Stream Name	Length (miles)	Boundaries	Listing Station ID:	Impairment for	Exceedance Rate*
VAN-A11R-01	Difficult Run	2.93	Confluence of Captain Hickory Run downstream to the confluence with the Potomac River	1ADIF000.86	Total Fecal Coliform (listed in 2004)	19/85 (22%)
					E. Coli (Listed in 2004)	5/21 (24%)

\* Based on DEQ water quality data collected between 1995 and 2006

# Bacteria TMDL: Accotink Creek

Upper Accotink Creek:  
TMDL Approved by DEQ  
and EPA (2003)

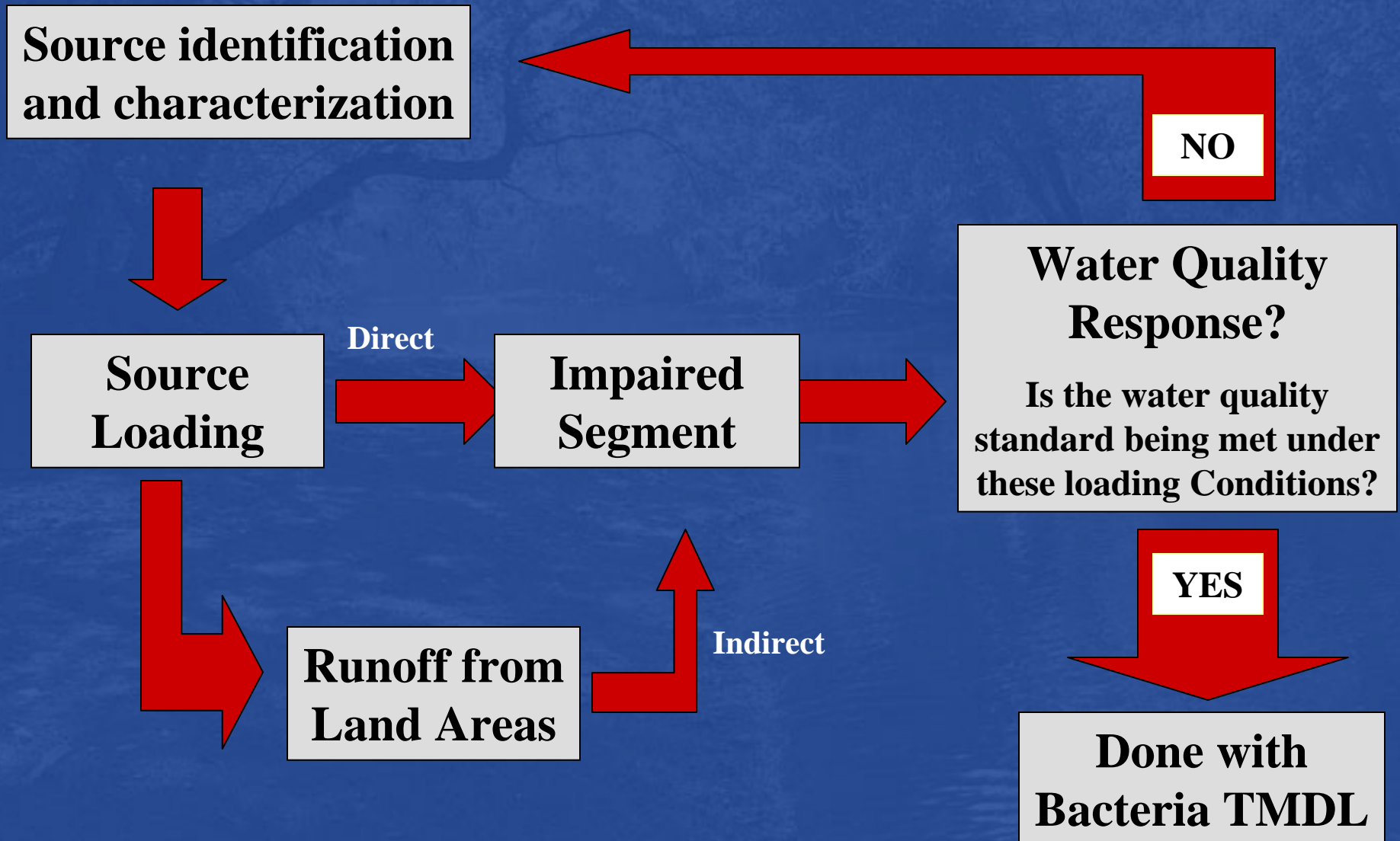


Lower Accotink Creek:  
Current TMDL Study  
Watershed

TMDL ID	Stream Name	Length (mi)	Boundaries	Station ID:	Impairment for	Exceedance Rate*
VAN-A15R-01	Accotink Creek	7.35	Confluence of Calamo Branch to end of free-flowing waters (Rt. 1)	1AACC006.10	Fecal Coliform (2004)	11/66 (17%)

\* Based on DEQ water quality data collected between 1995 and 2006

# Bacteria TMDL Development Process



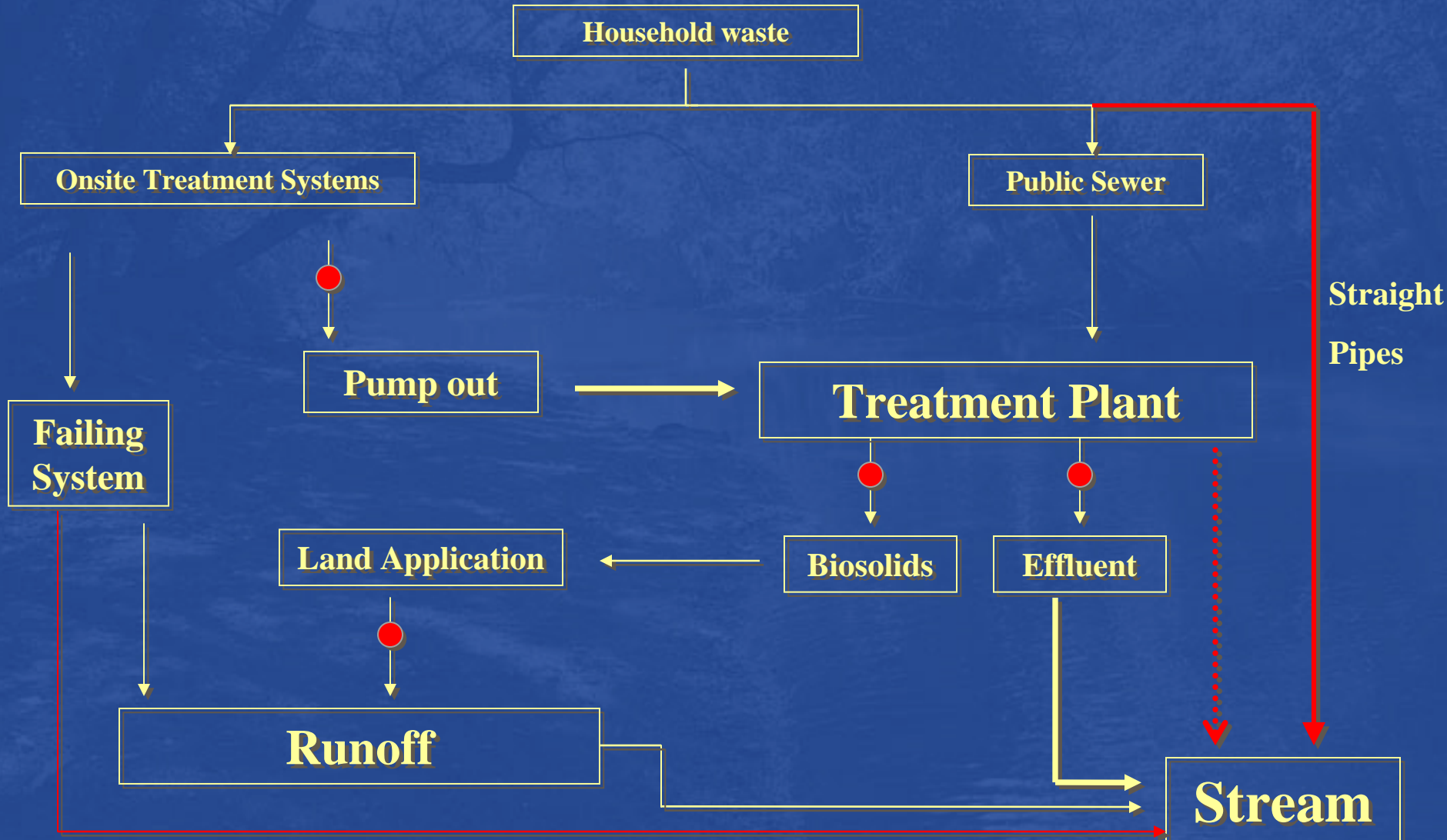
# Bacteria Sources Assessment

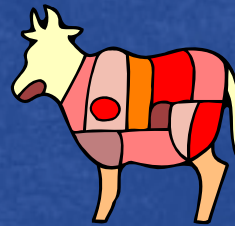
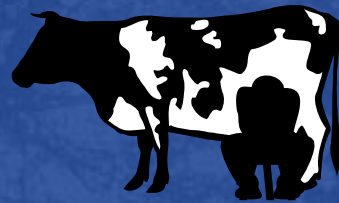
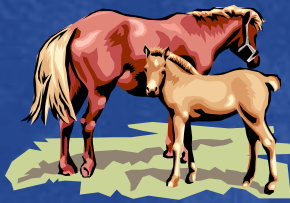
Addresses the following issues related to **bacteria** production:

- **Bacteria loading from Human Sources**
  - Straight pipes
  - Septic systems
  - Biosolids
- **Bacteria loading from Livestock**
  - Livestock inventory
  - Livestock grazing and stream access
  - Confined animal facilities
  - Manure management
- **Bacteria loading from Wildlife**
  - Wildlife Inventories
- **Bacteria loading from Pets**
  - Pet Inventories
- **Best management practices (BMPs)**

# Human Contribution

## Fecal Coliform Decay





Livestock

Pasture

Confinement

Manure Storage

Manure Spreading

Pasture

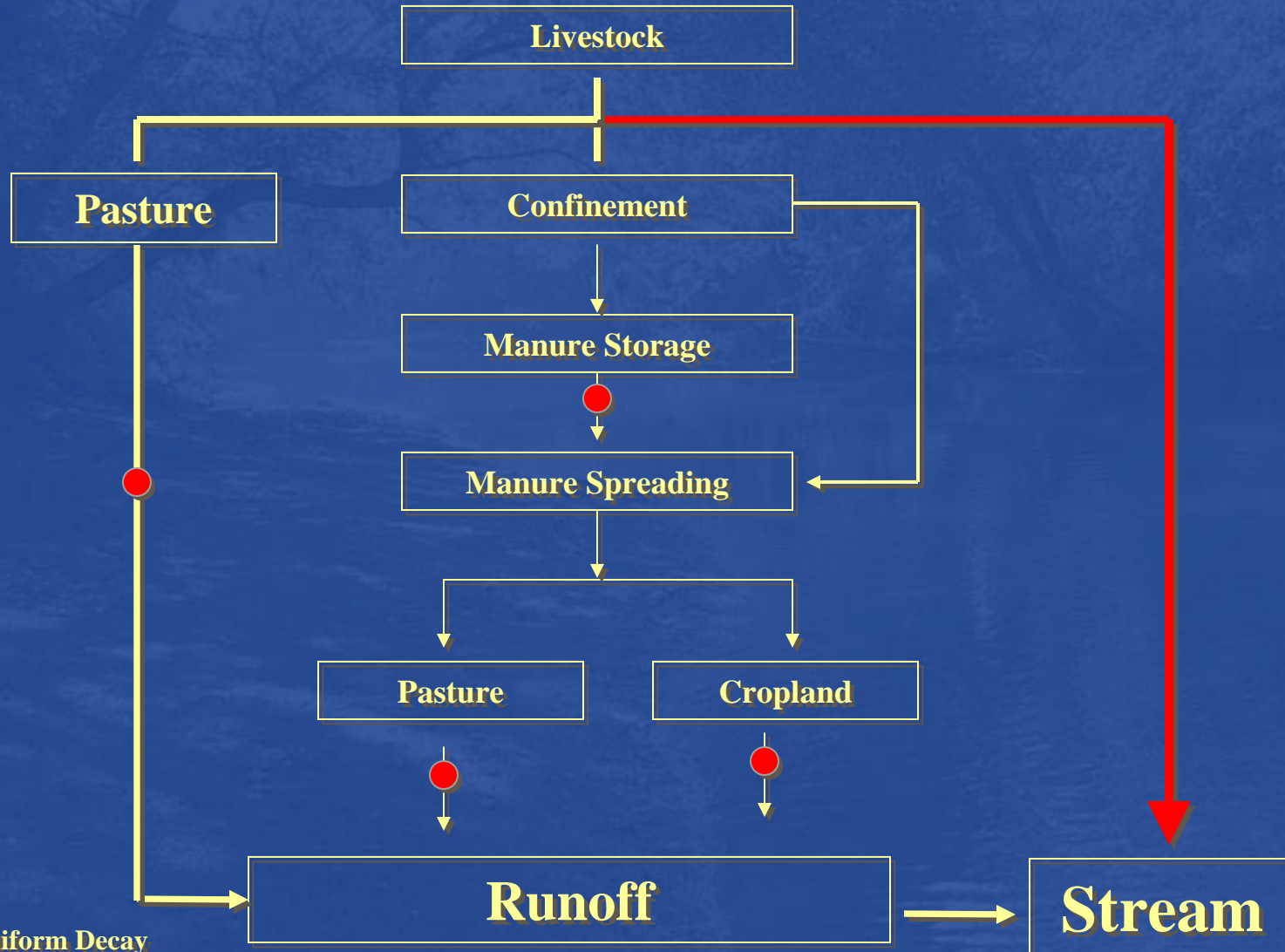
Cropland

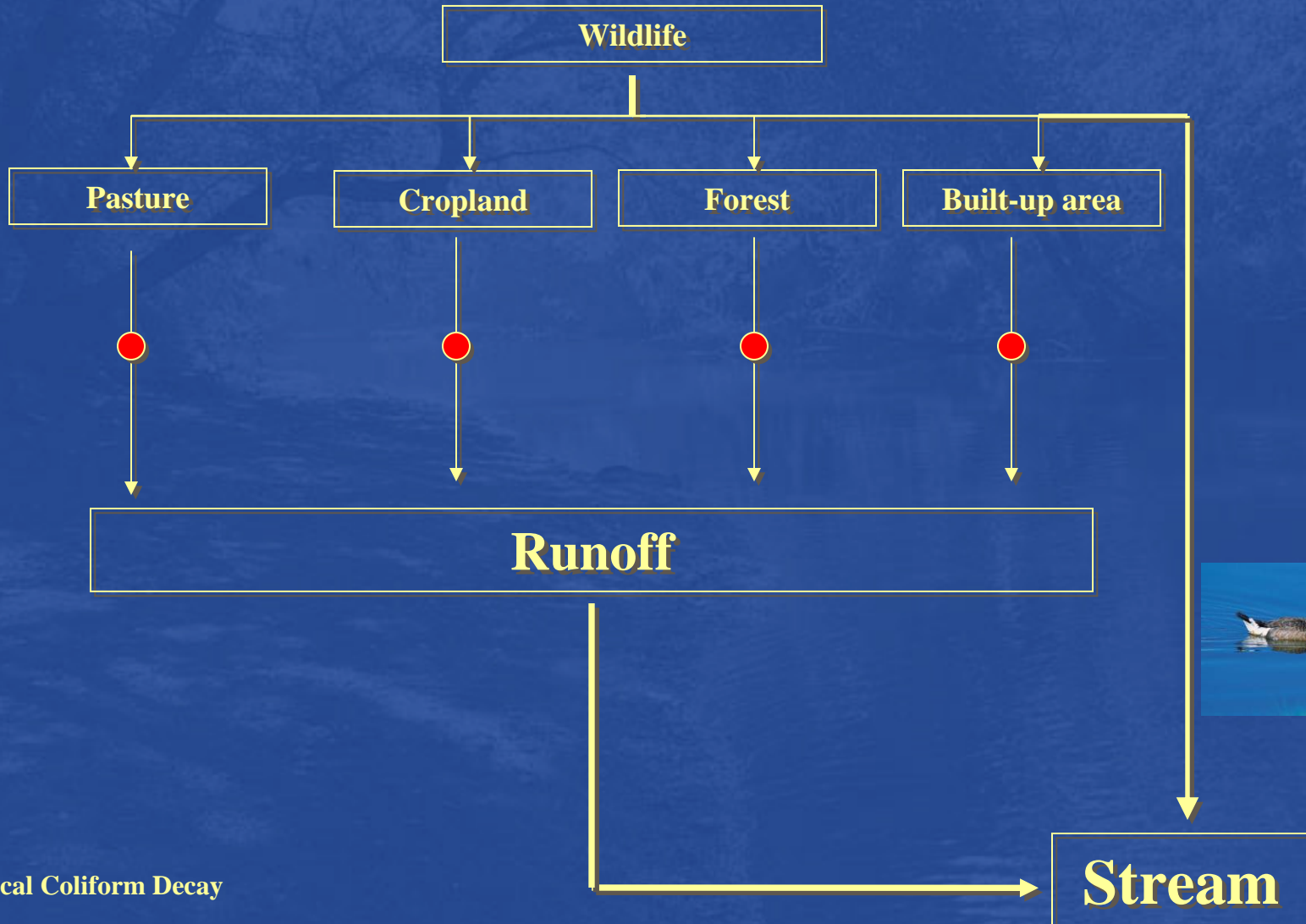
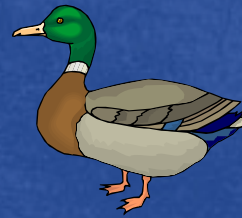
Runoff

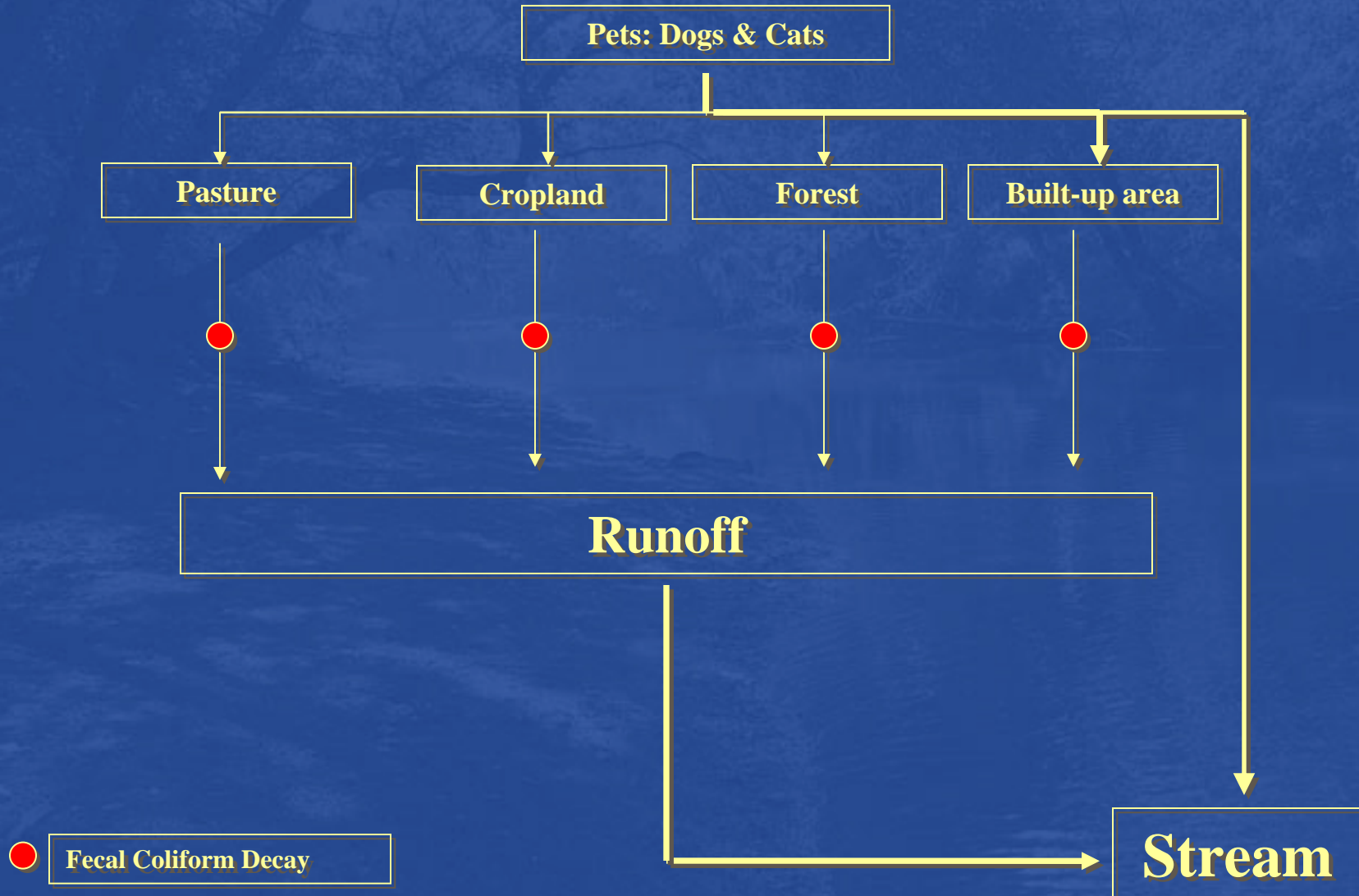
Stream



Fecal Coliform Decay







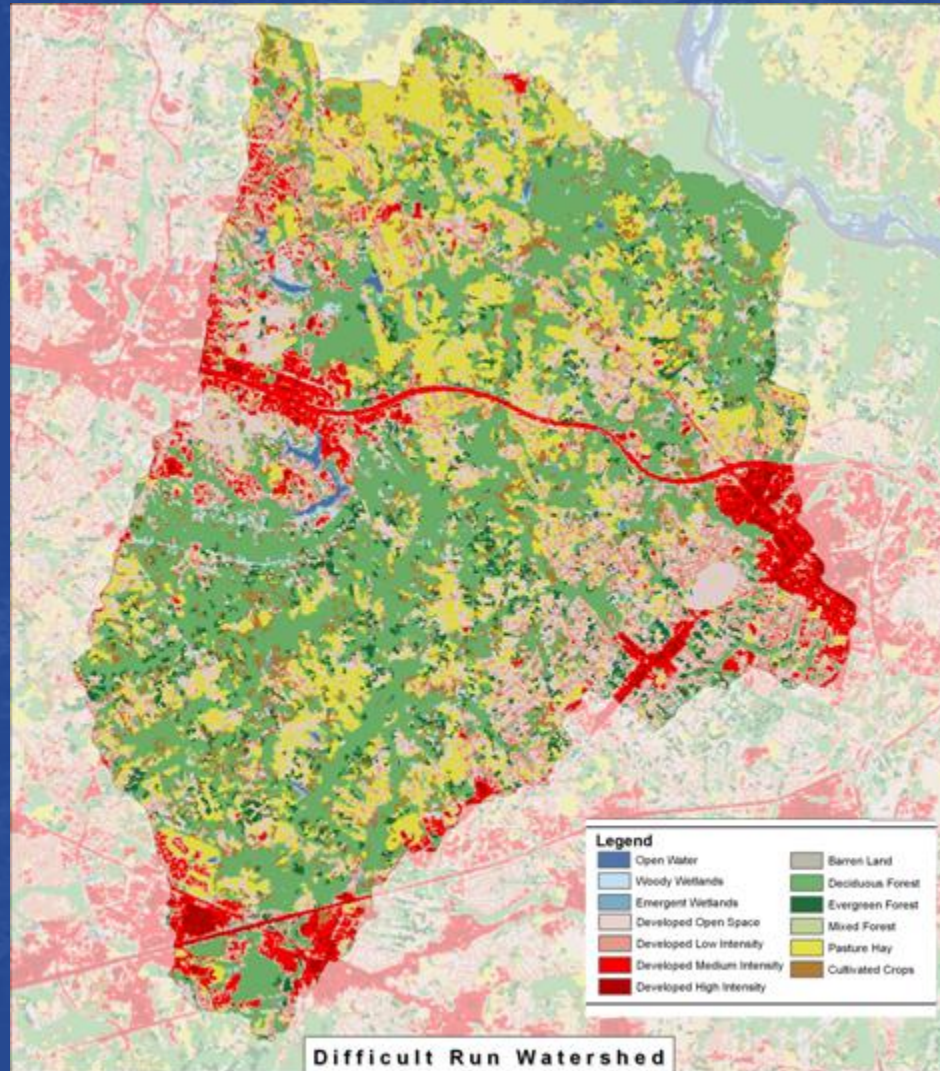
# Source Loading Estimates

- Determine the daily fecal coliform production by source
- Estimate the size/number of each source
- Determine whether the source is
  - Direct Source
  - Indirect Source
- Calculate the load to each land use based on a monthly schedule and for each source
- The sum of all the individual sources is the total load
- Source loading estimates used in a computer model to simulate in-stream bacteria concentrations

# Data and Information Needs:

- Watershed physiographic data
- Hydrographic data
- Weather data
- Permitted point sources and direct discharges
  - Permit data and information
  - Discharge monitoring reports (DMR)
- MS4 permits and information
- Environmental monitoring data
- Stream flow data
- Bacteria sources assessment data

# Difficult Run Watershed Land Use



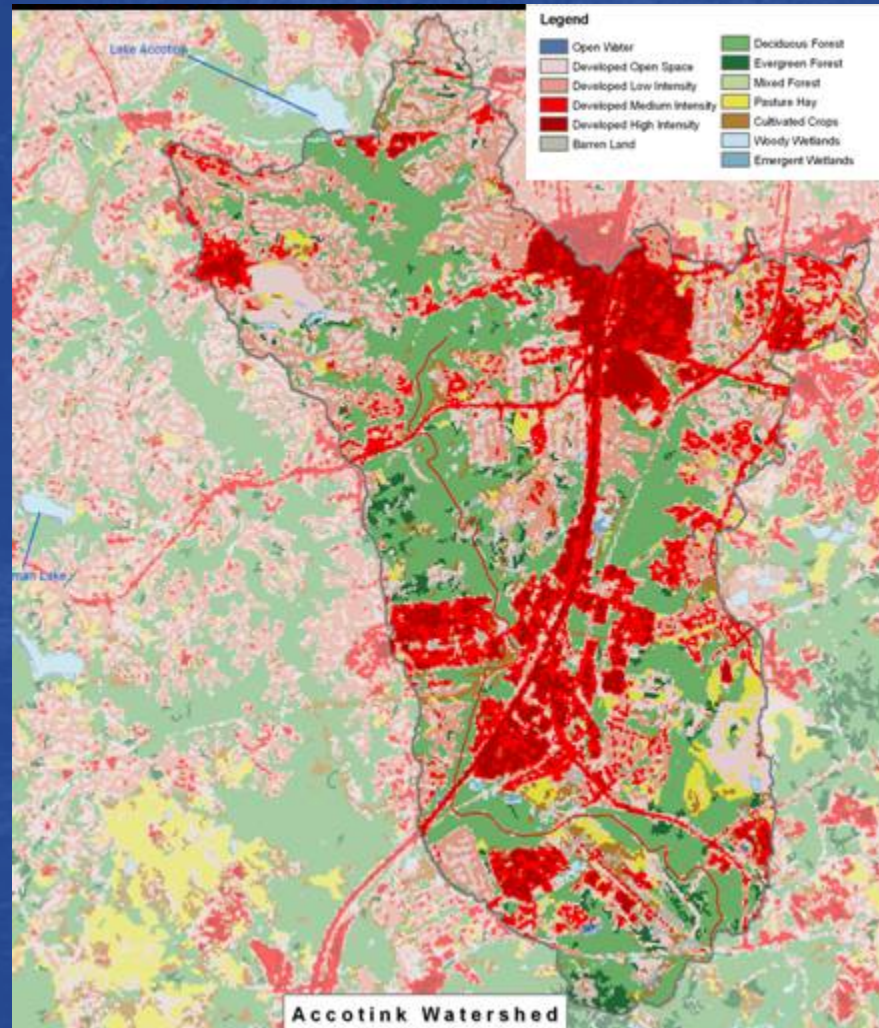
**Dominant Land Use Types:**

**Forest: 37%**

**Agricultural: 25%**

**Urban: 18%**

# Lower Accotink Creek Watershed Land Use



**Dominant Land Use  
Types:**

**Urban: 44%**

**Forest: 29%**

**Agriculture: 7%**

# Preliminary Population Estimates and Sewage Disposal

Based on 2004 US Census Data

## Difficult Run Watershed:

Watershed	Total Population	Total Households	Houses on:			
			Sewer	Septic	Failed Septic*	Other means
Fairfax County	123,430	48,155	44,967	3,087	50	~0
Fairfax City	849	320	316	4	0	~0
<b>Total</b>	<b>124,279</b>	<b>48,476</b>	<b>45,284</b>	<b>3,091</b>	<b>50</b>	<b>~0</b>

\*Failure Rate: 1.62% from NVPDC, 1990

## Accotink Creek Watershed:

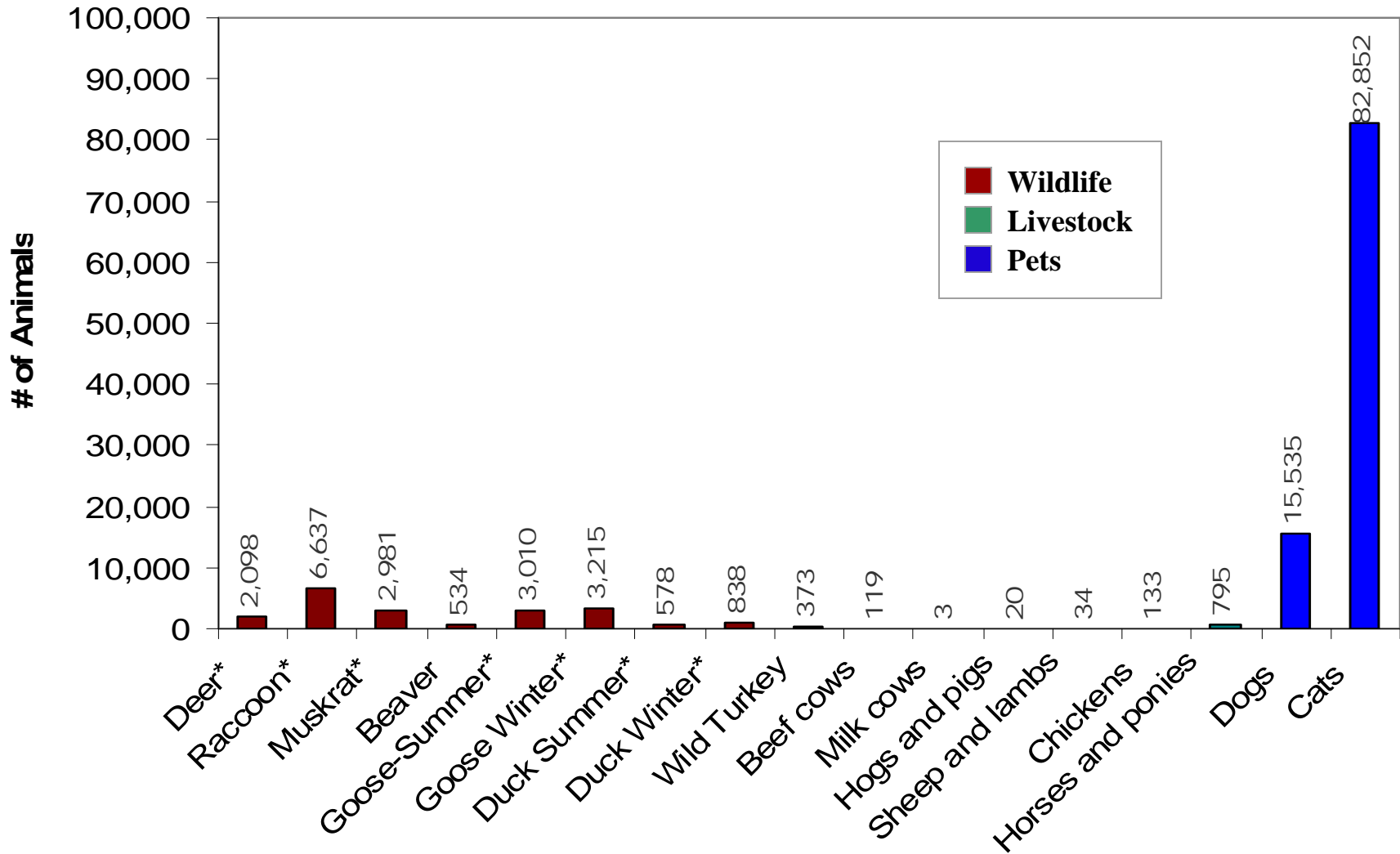
Watershed	Total Population	Total Households	Houses on:			
			Sewer	Septic	Failed Septic*	Other means
Upper <sup>1</sup>	110,000	40,741	39,727	1,014	16	~0
Lower <sup>2</sup>	51,624	16,237	15,162	1,041	17	~0
<b>Total</b>	<b>161,624</b>	<b>56,978</b>	<b>54,889</b>	<b>2,055</b>	<b>33</b>	<b>~0</b>

<sup>1</sup>Estimates based on 2000 US Census Data (Accotink Creek TMDL, 2003)

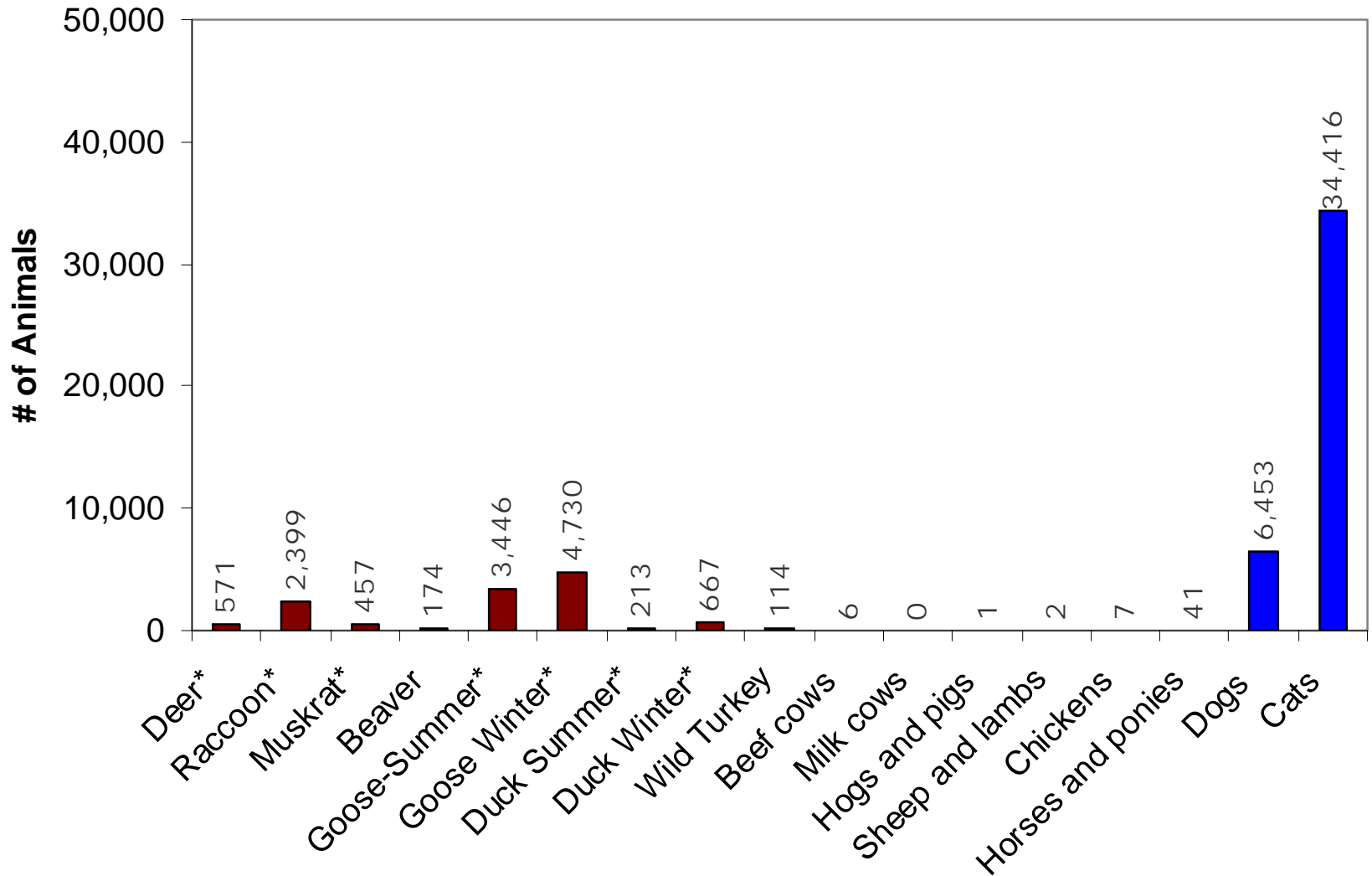
<sup>2</sup>Estimates based on 2004 US Census Data

\*Failure Rate: 1.62% from NVPDC, 1990

# Difficult Run Preliminary Animal Estimates



# Accotink Creek Preliminary Animal Estimates



# Preliminary Animal Estimates

- Livestock estimates are based on the Fairfax County 2002 US Agricultural Census data and the horse numbers are based on the 2001 VA Agricultural Statistics Equine report.
- Wildlife estimates are based on NLCD 2001 land use data and distribution estimates from DGIF and the distribution estimates from the Upper Accotink Creek Watershed TMDL (USGS, 2003)
- Pet Estimates based on Upper Accotink Creek TMDL (2003)
  - 1 dog per 8 people\*
  - 2 cats per 3 people \*

# Point Source Inventory

(VA Department of Environmental Quality)

Watershed	Permit Type	Count (Active or Application)
Accotink Creek	Individual Permits	5
	MS4	6
	Total	11
Difficult Run	Individual Permits	3
	MS4	5
	Total	8

# Next Steps

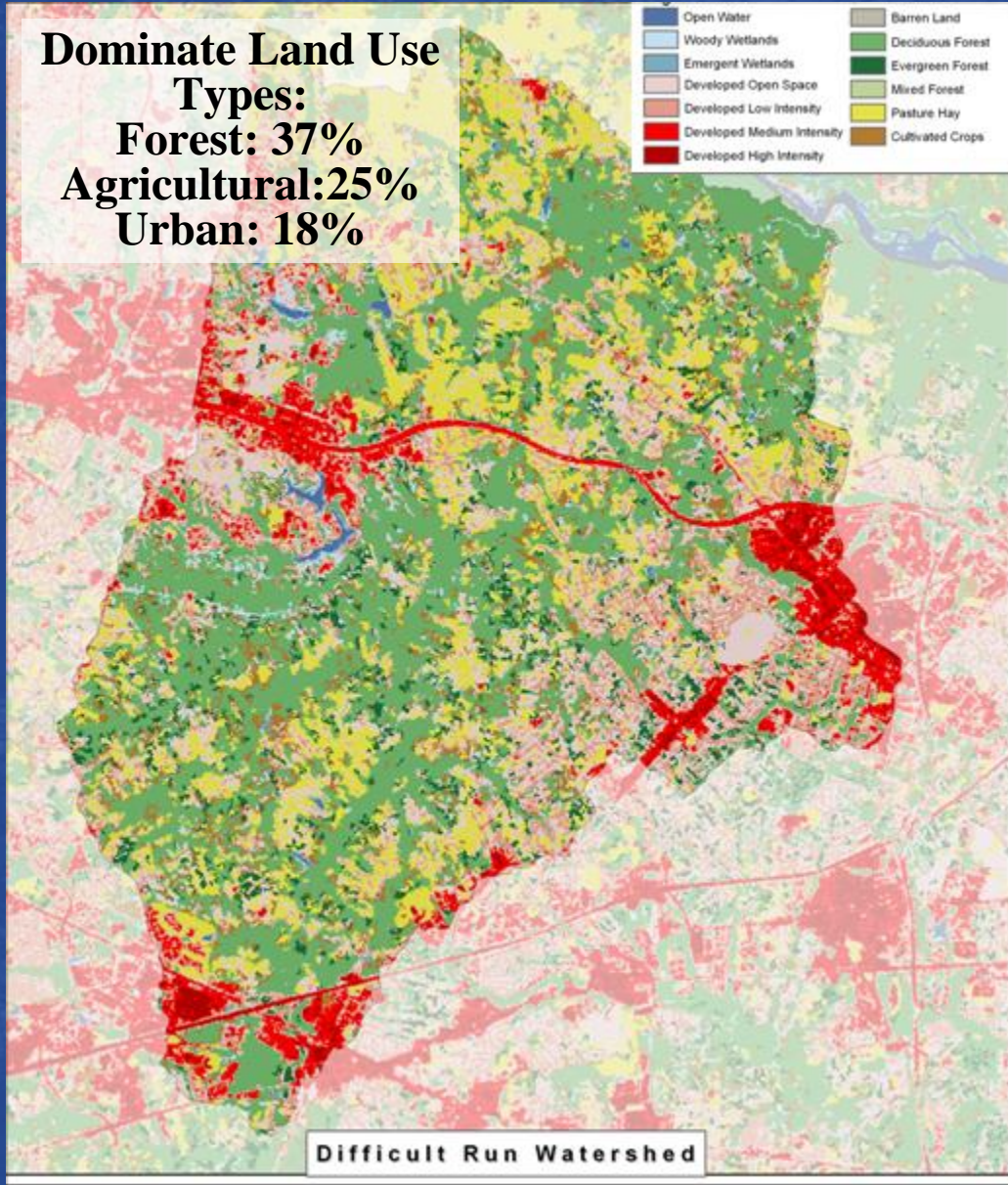
- Collect additional available data
- Finalize the inventories (Population, livestock, wildlife, etc)
- Analyze data to investigate the bacteria impairments in the watersheds
- Develop:
  - bacteria source loading estimates
  - modeling input parameters:
    - Hydrology and water quality
  - Develop draft TMDL scenarios

The background of the slide is a blue-tinted photograph of a river. In the foreground, the water is calm with some ripples. In the middle ground, a bridge with several arches is visible. In the background, there are trees and a hillside. The overall scene is peaceful and natural.

# Benthic TMDL

# Difficult Run Benthic Impairment

**Dominant Land Use  
Types:**  
**Forest: 37%**  
**Agricultural: 25%**  
**Urban: 18%**



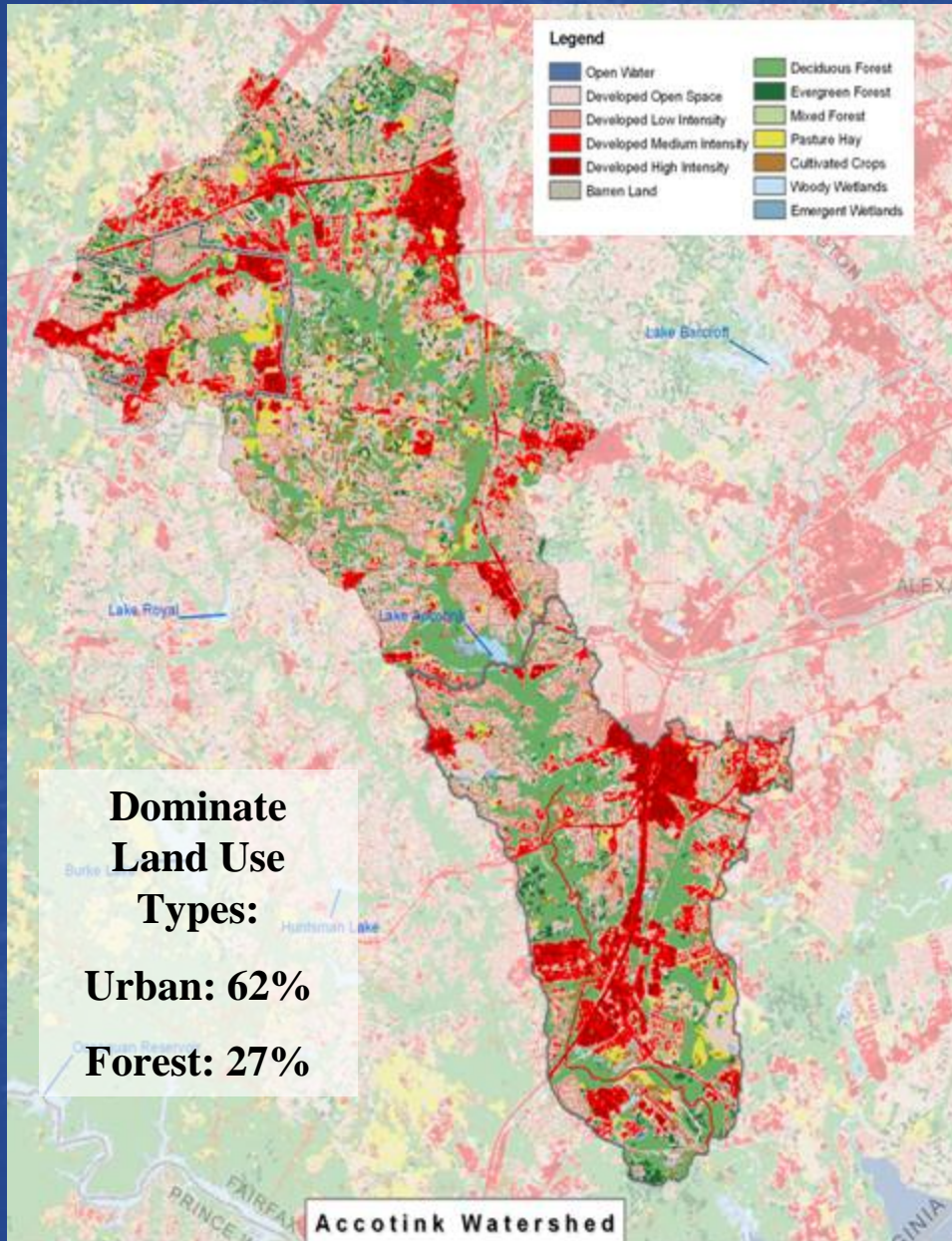
**TMDL ID: VAN-A11R-01**

**Length 2.93 miles**

Benthic Impairment begins at the confluence of Captain Hickory Run and extends to the Confluence with the Potomac River.

The segment was first listed in 1994 for moderate benthic impairment.

# Accotink Creek Benthic Impairment



**TMDL ID: VAN-A15R-01**

**Length 7.35 miles**

Benthic Impairment begins at the confluence of Calamo Branch and extends to the to end of free-flowing waters (Rt. 1).

The segment was first listed in 1996 for moderate benthic impairment.

# Biological Monitoring

- **Based on Biological Monitoring**
  - Assessments indicate the benthic community is impaired.
  - Therefore, the listed segments do not meet the Aquatic Life Use support goal.



**The General Water Quality Standard:** “All state waters shall be free from substances [...] which are harmful to human, animal, plant or aquatic life.” (9 VAC 25-260-20).

# TMDL Process for Benthic Impairment

## Stressor Identification

- Instream water quality
- Biological Monitoring



## Stressor Sources

- Point Sources
- Nonpoint Sources



Stream/River



## Loading

Reference Condition



End points



Stressor Load



Response?

Instream  
WQ

Benthic  
community

Common stressors  
include:

- Dissolved Oxygen
- Nutrients
- pH
- Temperature
- Sediment
- Toxics

# Benthic Stressor Identification

- What pollutant(s) is causing the impairment of the benthic community?
- Common stressors include:
  - Dissolved Oxygen
  - Nutrients
  - pH
  - Temperature
  - Sediment
  - Toxics

# Data Used in Stressor Identification

## Environmental Data:

1. **Biological and Habitat Assessment Data**
1. **Water Quality Data**
  - a) **Instream water quality data**
2. **Toxicity Testing**
  - a) **Acute toxicity testing**
  - b) **Chronic toxicity testing**
3. **Discharge Monitoring Reports (DMR)**
5. **Biologists field notes and observations**

# Stressor Identification

- Each candidate stressor will be evaluated based on available monitoring data, field observations, and consideration of potential sources in the watershed
- Potential stressors are further classified as a *non-stressor*, *possible stressor*, or *most probable stressor*.

# Classification of Stressors

- Non-stressors: The stressors with data indicating normal conditions and without water quality standard violations, or without any apparent impact
- Possible stressors: The stressors with data indicating possible links, however, with inconclusive data to show direct impact on the benthic community
- Most probable stressors: The stressors with the conclusive data linking them to the poorer benthic community

# Next Steps

- **Draft Stressor Analysis Report**
  - Identify stressors and potential sources
- **Modeling Approach Technical Memo**
- **TMDL Allocation Development**
- **Draft TMDL Reports**

# Comments? Feedback?

- Public Comment Period for this meeting extends from August 14, 2007 to September 13, 2007.
- All comments should be in writing. Please send them to:

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# Local TMDL Contacts



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**Reports/presentations available at:**

[www.deq.virginia.gov/tmdl/mtgppt.html](http://www.deq.virginia.gov/tmdl/mtgppt.html)

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